

Appendix M

Clean Water Act Section 404(b)(1)

APPENDIX M
PORT OF GULFPORT EXPANSION PROJECT
MISSISSIPPI STATE PORT AUTHORITY
SECTION 404(B)(1) EVALUATION

U.S. Army Corps of Engineers
Mobile District

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Acronyms and Abbreviations

BMC	Biloxi Marsh Complex – Northeastern Outlying Islands
BMP	best management practice
BU	beneficial use
BUG	Beneficial Use Group
DEIS	Draft Environmental Impact Statement
DMMP	Dredged Material Management Plan
EFH	Essential Fish Habitat
EIS	Environmental Impact Statement
EPA	U.S. Environmental Protection Agency
ERM	effects range medium
FNC	Gulfport Harbor Federal Navigation Channel
FR	Federal Register
GIWW	Gulf Intracoastal Waterway
Gulf	Gulf of Mexico
IH	Interstate Highway
mcy	million cubic yards
MDEQ	Mississippi Department of Environmental Quality
MDMR	Mississippi Department of Marine Resources
mg/L	milligrams per liter
MRL	minimum reporting limits
MSPA or Applicant	Mississippi State Port Authority
NEPA	National Environmental Policy Act
NMFS	National Marine Fisheries Service
NOI	Notice of Intent
ODMDS	Ocean Dredged Material Disposal Site
PAH	polycyclic aromatic hydrocarbon
PCBs	polychlorinated biphenyls
PCE	primary constituent element
PEL	probable effects level
PGEP	Port of Gulfport Expansion Project
Port	Port of Gulfport
SAP	Sampling and Analysis Plan
SEIS	Supplemental Environmental Impact Statement
SVOC	semivolatile organic compound
TEL	threshold effects level

TEQ	toxic equivalent
TEU	twenty-foot equivalent units
TOC	total organic carbon
TPH	total petroleum hydrocarbons
TRG	Target Remediation Goals
TSS	total suspended solids
µg/L	micrograms per liter
US	U.S. Highway
USACE	U.S. Army Corps of Engineers
USC	United States Code
USCS	Unified Soil Classification System
USDA	U.S. Department of Agriculture
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey
VOC	volatile organic compounds

Appendix M
Port of Gulfport Expansion Project
Mississippi State Port Authority
Section 404(b)(1) Evaluation

I. PROJECT DESCRIPTION

a. Location

The Port of Gulfport (Port) is located to the south of the City of Gulfport, Harrison County, Mississippi, but is within the city limits (shown on Figure 1.2-1 of the Environmental Impact Statement [EIS]). Larger metropolitan areas in the vicinity of Gulfport include Mobile, Alabama, which is 80 miles to the east and New Orleans, Louisiana, which is 80 miles to the west. The Port encompasses approximately 369 acres within 5 miles of the Gulf Intracoastal Waterway (GIWW), 10 miles from the Gulf of Mexico (Gulf), and Gulf National Seashore, and approximately 7 miles south of Interstate Highway 10 (I-10).

The Port is located on Mississippi Sound, which extends from Lake Borgne, Louisiana, to Mobile Bay, Alabama, and is geographically separated from the Gulf by a series of narrow islands and sand bars. The Port is accessible via the Gulfport Harbor Federal Navigation Channel (FNC), enters Mississippi Sound from the Gulf, and passes between Cat Island and West Ship Island.

The Applicant's (Mississippi State Port Authority [MSPA]) Proposed Project Alternative, Port of Gulfport Expansion Project (PGEP), includes the construction of wharfs, bulkheads, terminal facilities, container storage areas, intermodal container transfer facilities, infrastructure and breakwater, and dredging and dredged material placement (*Federal Register*, 2013).

A *study area* was defined to represent the area of resources potentially and indirectly affected by the proposed project, shown on Figure 3.0-1 of the EIS. Study area extent encompasses a 10.5-mile radius that includes Harrison County, the southeastern edge of Hancock County and the southwestern tip of Jackson County, and a portion of Mississippi Sound, which addressed Essential Fish Habitat (EFH) and potential effects to the Gulf sturgeon (*Acipenser oxyrinchus desotoi*).

The Project area is designed to provide spatial boundaries for evaluation of resources that may be directly impacted by the construction and operation of the proposed Project, and is, therefore, a smaller area, more immediate to the proposed Project features. Specifically, the Project area surrounding the Port is defined as the Project footprint with a 5,000-foot buffer.

b. General Description

On March 11, 2011, U.S. Army Corps of Engineers (USACE), Mobile District filed a Notice of Intent (NOI) in accordance with the National Environmental Policy Act (NEPA) process to develop an EIS for the PGEP. The PGEP, as described in the NOI (SAM-2009-1768-DMY, issued April 16, 2010), has been altered from its initial scope. Initially, approximately 700 acres of estuarine mud and sand bottom in the Mississippi Sound were proposed to be filled to expand

the collective footprint of the Port. The modified Project scope entails filling a smaller footprint of approximately 282 acres. The reduced footprint decreases the overall amount of fill necessary for expansion and will no longer impact the existing Anchorage Basin or FNC.

The Applicant's Proposed Project Alternative is to expand the facilities at the Port to provide appropriate infrastructure for handling up to 1.7 million twenty-foot equivalent units (TEUs) annually by 2060. This effort involves the dredging and filling of estuarine mud and sand bottom in Mississippi Sound, the construction of wharfs, bulkheads, terminal facilities, container storage areas, intermodal container transfer facilities, placement of new-work and maintenance dredged material, and construction of a breakwater. The proposed expanded Port facility would be elevated to up to +25 feet above mean sea level to provide protection against future tropical storm surge events.

The Applicant's Proposed Project Alternative will require removal and placement of approximately 7.5 million cubic yards (mcy) of sediment for the expansion of the piers and the creation of the Turning Basin.

This Section 404(b)(1) evaluation addresses discharges of dredged or fill material into waters of the U.S. as proposed by the Applicant's Proposed Project Alternative. The Applicant's Proposed Project Alternative evaluated in the EIS includes the following primary actions:

1. Dredging and impacts to approximately 282 acres of estuarine mud and sand bottom in Mississippi Sound for the construction of backlands, wharfs, bulkheads, terminal facilities, container storage areas, intermodal container transfer facilities, expanded turning basin, and construction of a breakwater of approximately 4,000 linear feet (approximately 18 acres of fill);
2. Proposed deepening of the federally authorized Turning Basin and proposed basin expansion to match the depth of the Sound Channel; and
3. Dredged material disposal.

The recommended placement alternative for the dredged material from the West and East Pier Expansion, North Harbor and West Pier berthing areas, and the Turning Basin expansion is a permitted Beneficial Use (BU) site such as the Biloxi Marsh Complex – Northeastern Outlying Island (BMC), other suitable BU sites if available, or the Pascagoula Ocean Dredged Material Disposal Site (ODMDS). The new work dredging associated with the construction of the above Port features as part of the proposed Project is estimated to require removal of approximately 7.5 mcy of dredged material, including 560,000 cy of dredged material (debris from East Pier) that would be designated for upland disposal. New work dredged material would be placed on a barge (without dewatering) and transported to the disposal site; material designated for upland disposal would be placed in a truck and hauled to a permitted and approved upland disposal site. Following construction of the Turning Basin Expansion, the MSPA would be responsible for maintenance dredging of the portion of the new Turning Basin that is not part of the federally authorized project, as well as the berthing areas associated with the expanded East Pier, North Harbor, and West Pier. Maintenance dredging associated with these areas is anticipated to require removal of approximately 313,000 cy to 1.3 mcy every year. A Dredged Material Management

Plan (DMMP) was prepared to evaluate potential placement options for the new work and maintenance dredged material associated with the Proposed Project Alternative (Anchor QEA LLC, 2015, Appendix E of the EIS). Estimated dredged material quantities are shown in Table 2.8-3 of the EIS. Estimated dredge quantities assume maintenance for a 30-year period. At this time, it is expected that new work dredging would occur using a mechanical/hopper dredge and maintenance dredging would occur using a hydraulic/cutterhead or mechanical/hopper dredges, as necessary.

The DMMP evaluated multiple placement alternatives for new work and maintenance dredged material. Sites considered for placement of dredged material include:

- Use as fill for the West Pier Expansion
- Twelve designated BU sites
- Thin-layer placement
- Candidate BU sites
- Placement in an approved ODMDS

All sites were evaluated based on feasibility, potential environmental impacts, cost, and suitability of material. Potential BU sites were evaluated based on capacity and distance to the dredge site, taking into consideration habitat value, stability, and sediment transport. Recommendations were made for each option (Anchor QEA LLC, 2015; see Appendix E of the EIS). Considering additional information is needed to finalize the recommendations of dredged material placement alternatives, the following summarizes the various placement options.

New work dredged material structurally suitable would be used for fill at the Project site. Any material not structurally suitable would be evaluated for potential beneficial use and possible placement at a designated or candidate BU site. The Mississippi Department of Marine Resources (MDMR) is pursuing a permit to designate an area in the BMC in Louisiana for beneficial use of dredged material. The goal of this designation is to provide a new BU site on the western side of the state to accommodate material generated from private and public dredging projects to meet the requirements of Mississippi's beneficial use law.

During the DMMP evaluation, the Port began discussions with the MDMR/USACE Beneficial Use Group (BUG) on using the BMC as a placement area for suitable dredged material from the Port (see Figure 1). For the proposed PGEP, the BUG was in favor of a BU site instead of an ODMDS. As such, the BMC is the recommended placement alternative for the new work dredged material for the proposed Project (Anchor QEA LLC, 2015, Appendix E of the EIS). If a suitable site is identified, appropriate coordination would occur in the future. The BMC BU site would function to provide needed particulate material for shoreline nourishment and as protection from shoreline erosion on the Mississippi and Louisiana coasts. If the BMC is not permitted prior to dredging, and no other suitable BU sites are available, the Pascagoula ODMDS (see Figure 1.2-1 of the EIS) would be used for disposal of new work dredged material if the material is determined to be in compliance with Section 103 of the MPRSA (33 USC 1413). New work, dredged material not suitable for beneficial use would also be placed in the Pascagoula ODMDS if it meets the criteria in Section 103 of the MPRSA. If the dredged material is not suitable for the ODMDS, the material would be placed in an approved and permitted upland disposal

site(s). The Port would be responsible for maintenance dredging of those areas outside of Federal jurisdiction. Maintenance dredged material will be disposed of as discussed in the DMMP (Anchor QEA LLC, 2015, Appendix E of the EIS). As with the use of a BU site, the use of thin-layer placement sites for the proposed Project would be handled under a separate and independent permitting process.

c. Authority and Purpose

The purpose of the proposed Applicant's Proposed Project Alternative is to increase throughput capabilities at the Port beyond 1.0 million TEUs annually and stimulate the local, regional, and state economy by creating direct, indirect, and induced jobs. An expanded footprint would allow the Port to increase container throughput to 1.7 million TEUs per year by 2060. The screening process used to identify practicable alternatives is described in Sections 2.3 through 2.6 of the EIS. The USACE sought additional avoidance and minimization measures through the regulatory review process in cooperation with the National Marine Fisheries Service (NMFS), MDMR, and the Mississippi Department of Environmental Quality (MDEQ). Alternatives that avoided water dependency were considered but determined not to meet the Applicant's purpose and need (see Section 1.5 of the EIS).

d. General Description of Dredged or Fill Material

(1) General Characteristics of Material

Almost all information within this 404(b)(1) evaluation is from the DMMP (Anchor QEA LLC, 2015, Appendix E of the EIS) and EIS, unless otherwise cited. Seven borings from the historical boring logs and sediment test results from the USACE channel deepening (USACE, 1992) and widening contract documents (USACE, 2009) were selected for evaluation based on their location to the proposed Turning Basin Expansion. The borings were classified using the Unified Soil Classification System (USCS), which describes the soil's grain size and texture. The majority of the sample material is classified as fine grained medium to high plasticity organic silt and clay. Other materials that were identified include silty and clayey sands and inorganic silts and clays (Anchor QEA LLC, 2015, Appendix E of the EIS).

The USACE (2011) dredging history classifies the Anchorage Basin maintenance materials as soft to very soft silts and clays. For the 2011 FNC widening, the USACE performed acoustic density profiles and profiles along the Sound Channel bottom, which indicated the presence of fluid mud, as reported previously in available literature (McAnally et al., 2007). The Anchorage Basin was not part of the FNC widening project, thus the profiles do not extend into this area; however, it is reasonable to assume that fluid mud is also present in the Basin. Detailed information regarding sediment quality and quantity is described in the DMMP (Anchor QEA LLC, 2015, Appendix E of the EIS).

(2) Quantity of Material

The Applicant's Proposed Project Alternative will require removal and placement of approximately 7.5 mcy of sediment for the expansion of the piers, berthing areas, and Turning Basin.

e. Description of the Proposed Discharge**(1) Location**

New work dredged material structurally suitable would be used for fill at the Project site. The recommended placement alternative for the dredged material from the West and East Pier Expansion, North Harbor and West Pier berthing areas, and Turning Basin expansion that is not structurally suitable for fill at the Project site is a permitted BU site. During the DMMP evaluation, the Port began discussions with the MDMR/USACE Beneficial Use Group (BUG) on using the BMC (Figure 8-1 of the DMMP) as a placement area for the dredged material from the Port (Anchor QEA LLC, 2015, Appendix E of the EIS). MDMR is currently working with Louisiana state officials to pursue a permit to designate a site within the easternmost areas of the BMC in Louisiana with adequate capacity for beneficial use of dredged material. Maintenance dredged material would be disposed of as discussed in the DMMP (Anchor QEA LLC, 2015, Appendix E of the EIS). As with the use of a BU site, the use of thin-layer placement sites for the proposed Project would be handled under a separate and independent permitting process.

(2) Size

The BMC is the recommended BU site for the Applicant's Proposed Project Alternative. Survey data is necessary to establish the actual capacity of the site and proposed placement (i.e., discharge) locations. The BMC is a complex that encompasses approximately 30,290 acres and includes islands, bays, and open-water lakes, specifically False Mouth Bay, Bay Boudreau, Drum Bay, and Shell Island Lake (Anchor QEA LLC, 2015; CH2M HILL 2011; T. Baker Smith, 2006). For practical purposes, the site currently is considered to have an unlimited capacity, which will need to be verified prior to BU site selection. Surveys of current and planned upland areas are also needed to determine the indigenous vegetation coverage and proposed application methods (Anchor QEA LLC, 2015, Appendix E of the EIS).

(3) Type of Site and Habitat

The proposed BMC site would function to provide needed particulate material for shoreline nourishment and as protection from shoreline erosion on the Mississippi and Louisiana coasts. Direct habitat affected by placement is estuarine mud and sand bottoms.

(4) Time and Duration of Discharge

It is anticipated that construction of the proposed Port expansion would not occur until the market demand at Gulfport supports additional growth (expected in approximately 2017). Although the precise timing of a construction start date is unknown, MSPA assumes construction would be initiated to alleviate market demands beginning in the expected year 2018. Maintenance events and discharges would occur for the life of the project.

f. Description of Disposal Method

Dredging activities for the Applicant's Proposed Project Alternative would be performed via one or a combination of three options: hopper, mechanical, or hydraulic cutterhead dredge. The dredge type would depend on the disposal location and required placement activity.

II. FACTUAL DETERMINATIONS**a. Physical Substrate Determinations****(1) Substrate Elevation and Slope**

Site details of the BMC BU site are still to be determined; however, the long-range goal of the BU site is to create mounds to encourage habitat development, intertidal circulation, and habitat diversity (Anchor QEA LLC, 2015, Appendix E of the EIS). Elevation and slope would vary from below sea level to several feet above sea level at the BMC BU site.

(2) Sediment Type

Sediments studied for the West Pier Expansion indicate a composition of low plasticity silts. Turning Basin sediment studies indicate mostly clays, and studies for channel sediments indicate mostly sands (Section 5 of the DMMP provides details of these sediment analyses).

(3) Dredged/Fill Material Movement

Although site details of the BMC BU are still to be determined, the long-range goal of the BU site is to create mounds to encourage habitat development, intertidal circulation, and habitat diversity (Anchor QEA LLC, 2015, Appendix E of the EIS). Elevation and slope would vary from below sea level to several feet above sea level at the BMC BU site. Any materials lost overtime due to general erosion or storm events are anticipated to remain within the system, since the location is not within the littoral drift.

(4) Physical Effects on Benthos

Some benthic fauna would be adversely affected by placement of materials. Benthic faunal recolonization of areas impacted by dredging and dredged material disposal can occur through vertical migration of buried organisms through the dredged material, immigration of post-larval organisms from the surrounding area, larval recruitment from the water column, and/or sediments slumping from the side of the dredged area (Bolam and Rees, 2003; Newell et al., 1998). Recolonization would not be anticipated in the widened portion of the channel.

(5) Other Effects

None identified.

(6) Actions Taken to Minimize Impacts

This Project was fully coordinated with State and Federal resource agencies, and their comments have been incorporated into the development of the Project and EIS to the maximum extent practicable. During construction, proper Best Management Practices (BMPs) would be implemented to minimize impacts on the biological and physical environment. The Applicant's Proposed Project Alternative would not result in loss of wetlands and would prefer to employ BU sites.

b. Water Circulation, Fluctuation, and Salinity Determinations**(1) Water**

Minimal effects are expected from the Applicant's Proposed Project Alternative on water exchange and inflows and salinity. There will be no changes to the amount of freshwater inflows in the Project area. Overall, no significant adverse impacts on hydrodynamics are expected due to the primary influences of tides, winds, and salinity from the Gulf in the study area.

(a) Salinity

Freshwater inflows and salinity levels would not be altered by the Applicant's Proposed Project Alternative. The area of water exchange with the near-shore Gulf would increase insubstantially compared to the total area of exchange within the study area. The multiple, wide passes where water moves between the Mississippi Sound and the Gulf are substantially greater in area than the area of exchange created by widening and deepening considered for the Port. Consequently, minimal to no measurable effect would occur as a result of the Proposed Project Alternative on salinity within the study area, Gulf, or Mississippi Sound.

(b) Water Chemistry

Measurable impacts from chemical contaminants, such as heavy metals, synthetic organic compounds, cyanide, and nutrients are not expected to occur. This conclusion is based on monitoring and laboratory bioassays conducted since 2000. Chemicals of potential concern are present in water and sediment, and different analytical tests evaluated the likelihood contaminants would impact water or sediment quality. Results of these analyses (see bullets below) indicate that no extensive or severe chemical contamination occurs in the harbor. The harbor is the portion of the Project surrounded by industry and may have been most susceptible to chemical contamination from adjacent industries, berthed vessels, loading and unloading operations, and stormwater runoff from industrial areas. Similarity between sediment composition in the harbor, FNC, ODMDS, and placement sites, which are considered minimally impacted in the Sound, combined with the general lack of contaminants of concern, indicate that sediment quality impacts resulting from placement of dredged materials using any of the placement options considered are not likely to occur (Anchor QEA LLC, 2015, Appendix E of the EIS).

Thompson Engineering Inc. (2015) recently completed testing of potential dredged material associated with the Port of Gulfport Spool Base located adjacent to the existing Port of Gulfport East Pier, in accordance with the Sampling and Analysis Plan (SAP) approved on February 27, 2015 by the MDMR. Sediment analytical results from the recent testing did not identify any detectable concentrations of volatiles or pesticides in the two sediment core borings but found one constituent (acenaphthene) above the Screening Quick Reference Tables threshold effects level (TEL) and probable effects level (PEL) screening levels; however, the reported concentration was below the Mississippi Department of Environmental Quality (MDEQ) Tier 1 Target Remediation Goals (TRGs). Several dioxins and furans were detected in both sediment samples but were also below the MDEQ Tier 1 TRGs. The arsenic concentrations reported in both sediment samples exceeded the MDEQ Tier 1 TRGs and the TEL but were both below the PEL. All other detectable concentrations of constituents were either below the TEL, PEL, and MDEQ Tier 1 TRGs or below the MDEQ Tier 1 TRGs and between the TEL and PEL screening levels. As stated above, placement of the proposed dredged material from the East Pier as part of the proposed Project would meet all applicable regulations and be disposed of in permitted and approved upland disposal areas.

Elutriate testing (Anchor QEA LLC, 2013) found ammonia and several total and dissolved metals, including arsenic, chromium (total), copper, lead, nickel, selenium, and zinc that were above the minimum reporting limits (MRL) in one or more samples. Cadmium, chromium VI, mercury, and silver were not detected above the MRL in any elutriate sample. In all samples, cyanide, organometallic compounds, semivolatile organics, and pesticides were not detected in any of the elutriate samples. Dissolved copper in the GP-DU5-Comp elutriate sample exceeded the U.S. Environmental Protection Agency (EPA) and Mississippi State Water Quality Criteria by 2.3 times.

For the water quality samples, all analytes were below EPA and Mississippi State Water Quality Criteria (Anchor QEA LLC, 2015, Appendix E of the EIS). Ammonia, cyanide, and pesticides were not detected in the samples. Only total arsenic and total selenium were detected at concentrations greater than the MRL. Dissolved arsenic and selenium were also detected in the samples. Total chromium (III and IV), dissolved lead, and pentachlorophenol were estimated at concentrations below the MRL. All other total and dissolved metals were not detected (Anchor QEA LLC, 2013).

Spills could result in detrimental effects to water chemistry. Increased transit of vessels along the FNC may increase the risk of spills. The probability of increased contamination cannot be quantified but would be expected to be low based on the low frequency of incidents in the past (Anchor QEA LLC, 2015, Appendix E of the EIS) and increased State and Federal focus on spill prevention and response over the past 20 years.

(c) Clarity

There may be some temporary and localized increases in turbidity during excavation and placement. Effects on water clarity are expected to be temporary and would generally be limited to periods of dredging and placement activities. Water clarity would be expected to return to background levels shortly after operations are completed. It is important to

note that periodic turbidity naturally occurs in Mississippi Sound, and there are no resources (e.g., sea grass) within the Project footprint which are particularly sensitive to short-term reductions in water clarity. BMPs would be implemented to help control turbidity within the immediate dredging area.

(d) Color

Water immediately surrounding some construction areas (i.e., where dredging or fill placement would occur) may become discolored temporarily due to disturbance of the sediment. BMPs would be implemented to reduce and control turbidity during construction and material placement.

(e) Odor

Portions of the material may be anoxic, and temporary and localized sulfidic odors could occur during operations.

(f) Taste

No detectable impact to the environment would be expected. There are no drinking water intakes in the Project area, since it is a marine environment.

(g) Dissolved Gas Levels

Dissolved oxygen has been measured near 0 milligrams per liter (mg/L) below water depths of 30 feet in the harbor (USACE, 2006) and in the middle and bottom of the water column in deepened parts of the Turning Basin. Dredging may cause some mixing of bottom water with low oxygen and oxygenated water higher in the water column, resulting in lowered oxygen concentrations higher in the water column. Additionally, disturbed sediment with oxygen-demanding materials may increase oxygen demand in bottom waters and at the placement areas. Possible episodes of lowered oxygen concentrations would be localized and temporary and expected to return to pre-dredging conditions within a day after dredging and placement activities ceased. For other potential dissolved gases, the Project would not create conditions that would cause an increase in levels (e.g., increased solar gain, increased aeration, or additional nutrient loading).

(h) Nutrients

Project implementation would not create conditions that would increase nutrient loading, and no detectable negative impact would be expected.

(i) Eutrophication

Project implementation would not create conditions that would increase nutrient loading, and eutrophication would not be expected.

(j) Others as Appropriate

None known.

(2) Current Patterns and Circulation

Circulation patterns in the Project area are driven by astronomical tides, winds, and to a lesser degree, freshwater discharge (Orlando et al., 1993; Seim et al., 1987). Mississippi Sound has substantial openings in the barrier island system. The estimated footprint of the Port would be 650.5 acres, which approximately 0.05 percent of Mississippi Sound's area; thus, the Applicant's Proposed Project Alternative would not measurably alter current patterns and circulation.

(a) Current Patterns and Flow

Maintenance dredging frequency may not increase; however, the maintenance dredged material volume may increase (Anchor QEA LLC, 2015, Appendix E of the EIS). All dredge placement sites were evaluated based on feasibility, potential environmental impacts, cost, and suitability of material. Potential BU sites were evaluated based on capacity and distance to the dredge site, taking into consideration habitat value, stability, and sediment transport.

(b) Velocity

The channel cross-section of the proposed Project footprint is an insignificant increase when compared to the total area of exchange taking place in the study area. Therefore, velocities are not expected to increase to any measureable degree.

(c) Stratification

Adverse impacts to stratification are not anticipated, since the Applicant's Proposed Project Alternative would not be expected to measurably alter circulation patterns.

(d) Hydrologic Regime

Adverse impacts to hydrologic regime are not anticipated, since the Applicant's Proposed Project Alternative would not be expected to measurably alter circulation patterns. There will be no modifications or diversions of freshwater inflow; therefore, freshwater inflows would not be affected by the Applicant's Proposed Project Alternative.

(3) Normal Water Level Fluctuations

The average water surface elevation through the study area would be unaffected by the Applicant's Proposed Project Alternative, and no significant increase in tidal amplitude would be expected.

(4) Salinity Gradients

Freshwater inflows and salinity gradients would not be altered by the Applicant's Proposed Project Alternative. The area of water exchange with the near-shore Gulf would not increase substantially compared to the total area of exchange within the study area. The multiple, wide passes where water moves between Mississippi Sound and the Gulf are substantially greater in area than the area of exchange created by widening and deepening considered for the Port. Consequently, minimal to no measurable effect would occur as a result of the Proposed Project Alternatives on salinity gradients within the study area, Gulf, or Mississippi Sound.

(5) Actions that Will Be Taken to Minimize Impacts

In addition to the refinement of the action alternatives and planning and coordination with State and Federal agencies, fill will be placed to avoid impacts to various resources, such as threatened and endangered species habitat, cultural resources, and seagrasses. Also, BMPs will be implemented during construction activities to further minimize the potential of adverse effects on these resources.

c. Suspended Particulate/Turbidity Determination**(1) Expected Changes in Suspended Particulates and Turbidity Levels in Vicinity of Disposal Site**

An increase in suspended particulates and concomitant turbidity levels may occur during placement operations. These are temporary and localized events, and appropriate BMPs would be implemented. The BU site would likely incorporate containment efforts depending on the proposed placement method. BMPs would be used during any placement operations to further minimize any potential adverse effects.

(2) Effects on Chemical and Physical Properties of the Water Column**(a) Light Penetration**

Turbidity levels will be temporarily increased during placement operations. These are temporary and localized events, and appropriate BMPs would be implemented.

(b) Dissolved Oxygen

Recent water column monitoring showed bottom water dissolved oxygen can be low, approaching 0 mg/L, particularly in the Turning Basin (Appendix G of the EIS; EPA, 1999, 2013, Orlando et al., 1993; USACE, 2006). Dissolved oxygen in the middle and bottom of the water column in deepened parts of the Turning Basin would be measurably lower and most of the time would remain lower than adjacent shallower waters in the study area and Mississippi and Chandeleur sounds. Low dissolved oxygen conditions may exclude some types of nekton and benthic macroinvertebrates, which require oxygen levels above 4 mg/L. Since the increased area with low dissolved oxygen would be very small, it should not measurably affect ecological health in the study area, Gulf, or

Mississippi Sound. Dredging may cause some mixing of anoxic bottom water with aerated surface water, possibly resulting in hypoxic surface conditions. Additionally, disturbed sediment with oxygen-demanding materials may increase oxygen demand in bottom water and at the placement areas. However, these possible hypoxic episodes would be localized and temporary and expected to return to predredge conditions within a day after dredging and placement activities ceased.

(c) Toxic Metals and Organics

Measurable impacts from chemical contaminants like heavy metals, synthetic organic compounds, cyanide, and nutrients are not expected to occur. This conclusion is based on monitoring and laboratory bioassays conducted since 2000. The following are the primary conclusions drawn from the various analyses:

- Chemicals in water samples from Gulfport Harbor in November and December 2012 were below EPA and Mississippi State Water Quality Criteria (Anchor QEA LLC, 2015, Appendix E of the EIS; Appendix G of the EIS).
- Dissolved copper was the only chemical in elutriate samples collected from Gulfport Harbor in November and December 2012 that exceeded EPA and Mississippi State Water Quality Criteria (Anchor QEA LLC, 2015, Appendix E of the EIS). Samples were collected for metals from different locations throughout the study area and all were below Mississippi Water Quality Criteria (see Appendix G of the EIS). Earlier elutriate monitoring showed levels of ammonia, dieldrin, and endrin high enough to exceed Mississippi Water Quality criteria with levels of metals, PCBs, and other pesticides below criteria or detectable levels (USACE, 2006).
- Solid phase and suspended particulate phase toxicity bioassays indicated Turning Basin sediments were not acutely toxic (Anchor QEA LLC, 2015, Appendix E of the EIS). EPA (2013) and USACE (2006) evaluated sediment toxicity and found sediments from the FNC were not acutely toxic.
- Turning Basin sediment contaminants of concern did not bioaccumulate in concentrations statistically greater than U.S. Food and Drug Administration's action levels (Anchor QEA LLC, 2015, Appendix E of the EIS).
- A review of EPA Superfund sites indicated that no Superfund sites are located adjacent to the harbor (Anchor QEA LLC, 2015, Appendix E of the EIS).
- Review of the USCG's National Response Center website of potential hazardous material releases from 2001 to 2010 revealed no reports of contamination resulting from loss of cargo (Anchor QEA LLC, 2015, Appendix E of the EIS).
- Thompson Engineering Inc. (2015) recently completed testing of potential dredged material associated with the Port of Gulfport Spool Base located adjacent to the existing Port of Gulfport East Pier, in accordance with the Sampling and Analysis Plan (SAP) approved on February 27, 2015, by the MDMR. Sediment analytical results from the recent testing did not identify any detectable concentrations of volatiles or pesticides in the two sediment core

borings, but found one constituent (acenaphthene) above the Screening Quick Reference Tables TEL and PEL screening levels; however, the reported concentration was below the MDEQ Tier 1 TRGs. Several dioxins and furans were detected in both sediment samples but were also below the MDEQ Tier 1 TRGs. The arsenic concentrations reported in both sediment samples exceeded the MDEQ Tier 1 TRGs and the TEL but were both below the PEL. All other detectable concentrations of constituents were either below the TEL, PEL, and MDEQ Tier 1 TRGs or below the MDEQ Tier 1 TRGs and between the TEL and PEL screening levels. As stated above, placement of the proposed dredged material from the East Pier as part of the proposed Project would meet all applicable regulations and be disposed of in permitted and approved upland disposal areas.

(d) Pathogens

None expected or found.

(e) Aesthetics

The Project has been designed and selected in coordination with resource agencies to avoid detrimental environmental impacts and reduce or eliminate impacts on the aesthetic value of the area. The BMC BU site would contribute to barrier island development and protection, which should preserve and increases area aesthetics.

(f) Others as Appropriate

None known.

(3) Effects on Biota

Dredging and disposal activities as part of the Proposed Project Alternative would have immediate impacts to immobile benthic organisms at those locations. Furthermore, water-column turbidity, in close proximity to these activities, may temporarily impair the ability of organisms to filter feed or sight feed and block photosynthesis. However, these disturbances would be short term, typically lasting less than a day or within the timeframe of the tidal cycle.

(4) Actions Taken to Minimize Impacts

In addition to the refinement of the action alternative and planning and coordination with State and Federal agencies, fill placement areas will be located to avoid impacts to various resources, such as threatened and endangered species habitat, cultural resources, or seagrasses. Placement areas will be developed in coordination with State and Federal natural resource agencies. Also, BMPs will be implemented during construction activities to further minimize the potential of adverse effects on these resources.

d. Contaminant Determinations

Measurable impacts from chemical contaminants like heavy metals, synthetic organic compounds, cyanide, and nutrients are not expected to occur. Metals were detected at concentrations below their respective effects range median (ERM) values at the 10 Dredge Unit stations and two reference locations. Only two polycyclic aromatic hydrocarbons (PAHs) were detected above ERM values at one station, and one PAH was detected above the ERM value at one reference location. Total petroleum hydrocarbons (TPHs), pesticides, organometallic compounds, and semivolatile organic compounds (SVOCs) were either not detected at a level of concern or not detected at all in the samples from the Gulfport Turning Basin and reference locations. Chemical analyses showed Gulfport sediments and reference sediments were similar and generally lacking in contaminants of concern. Details of contaminant determinations are in the DMMP (Anchor QEA LLC, 2015, Appendix E of the EIS).

No detectable concentrations of volatile organics or pesticides were identified in the samples collected from the immediate vicinity south of the East Pier in May 2015 as part of the proposed (unrelated) Port of Gulfport Spool Base project. Multiple semivolatile organics, polychlorinated biphenyls, dioxins and furans, and metals were detected in the samples. The sediment analyses found only one constituent (acenaphthene – an SVOC) at concentrations greater than Federal TELs and PELs; however, the concentrations were less than the MDEQ TRGs. Specific dioxins and furans had concentrations that exceeded their MDEQ TRGs for unrestricted soil but were less than their TRGs for restricted soil. Total concentrations for dioxins and furans were less than the MDEQ Level I TRGs. The arsenic concentrations in both sediment samples exceeded the MDEQ TRGs and the TEL, but were less than the PEL. All other detectable constituent concentrations were either less than their TELs, PELs, and MDEQ TRGs or were less than the MDEQ TRGs and between their TELs and PELs. The effects of the ten-day sediment toxicity test identified no significant mortality in the organisms tested.

e. Aquatic Ecosystem and Organism Determinations**(1) Effects on Plankton**

Construction and placement operations are expected to have temporary, localized impacts on plankton from potential increased turbidity levels.

(2) Effects on Benthos

Some benthic fauna would be adversely affected by placement of materials. Benthic faunal recolonization of areas impacted by dredging and dredged material disposal can occur by organisms migrating vertically through the dredged material, immigration of post-larval organisms from the surrounding area, larval recruitment from the water column, and/or sediments slumping from the side of the dredged area (Bolam and Rees, 2003; Newell et al., 1998).

(3) Effects on Nekton

Construction and placement operations are expected to have temporary, localized impacts on nekton from potential increased turbidity.

(4) Effects on Aquatic Food Web

Turbidity from total suspended solids (TSS) can interfere with light penetration and reduce phytoplankton and macrophyte photosynthesis (Wilber and Clarke, 2001); although, little if any macrophytes occur in the Project area. Reduced light penetration due to turbidity may have a short-term impact on zooplankton populations, since they graze on microalgae. Such reductions in primary productivity would be localized, confined to the immediate area of the dredging and placement operations, and would be limited to the duration of the plume at a given site. Conversely, the decrease in primary production, presumably from decreased available light, can be offset by an increase in nutrient content which are released into the water column during dredged material placement activities (Morton, 1977; Newell et al., 1998). These nutrients may act to enhance the area surrounding the dredging activities, thus increasing productivity. Although, as previously mentioned, the increase in available nutrients will likely be minimal, and significant eutrophication would not be expected. Appropriate BMPs would be implemented to minimize or avoid detrimental effects to aquatic trophic dynamics.

(5) Effects on Special Aquatic Sites

No direct impacts to Special Aquatic Sites are anticipated as a result of the Applicant's Proposed Project Alternative. Seagrass beds, the only special aquatic sites near the Project footprint, occur approximately 5 miles from the Project area.

f. Proposed Disposal Site Determinations**(1) Mixing Zone Determination**

The placement of dredge material in the coastal areas of Mississippi would be managed by Mississippi's requirement that turbidity not exceed 50 Nephelometric Turbidity Units above background outside a 750-foot mixing zone around dredged material placement areas in coastal areas of Mississippi (Anchor QEA LLC, 2015, Appendix E of the EIS).

(2) Determination of Compliance with Applicable Water Quality Standards

MDEQ has been part of Project coordination, and a Joint Application and Notification for water quality standards review has been submitted.

(3) Potential Effects on Human Use Characteristics**(a) Municipal and Private Water Supply**

No apparent private, public, or industrial water wells registered with the State of Mississippi would be destroyed and/or affected by the Applicant's Proposed Project

Alternative based on their proximal distances and completed depths below surface grade. Furthermore, the Project is entirely within the marine/estuarine environment and does not include freshwater resources.

(b) Recreational and Commercial Fisheries

During dredging and placement, some localized areas may be temporarily excluded from recreational and commercial fish/shellfish harvest, and the dredging activities may temporarily impact reproduction and recruitment of certain species. However, these impacts would be limited in space and time and are not expected to have long-term impacts to the value of these resources.

Dredging and fill activities for the Proposed Project Alternative would have a temporary impact on recreational and commercial boaters moving along the coastline. Boaters would be required to travel further out into the Gulf to circumvent Port structures, and it would therefore take more time than currently to navigate around the Port. However, these impacts would be temporary and short term.

There would be negligible, if any long-term impact with respect to water quality, and there should be no long-term impacts to fisheries once the Project is complete.

(c) Water-related Recreation

Boating and recreational/commercial fishing are important uses in the study area. As discussed above, there should be no long-term impacts associated with the project. However, short-term impacts may be associated with localized increases in turbidity, causing boaters to avoid the area. In addition, some of the areas will be excluded from boaters due to dredging and placement activities. Impacts to recreational boating would be nominal.

(d) Aesthetics

The Applicant's Proposed Project Alternative is designed to minimize any adverse impacts to the environment and includes beneficial use of dredged material for shoreline nourishment and as protection from shoreline erosion. The Applicant's Proposed Project Alternative is consistent with current aesthetics in the Project and study area.

(e) Parks, National and Historic Monuments, National Seashores, Wilderness Areas, Research Sites, and Similar Preserves

No national parks, historic monuments, national seashores, etc. occur within the Project area. Barrier islands associated with Gulf Islands National Seashore, including East Ship Island, West Ship Island, and Cat Island, are at a sufficient distance from Gulfport that recreational access to them and Fort Massachusetts would not be impacted by the expansion of the Port.

g. Determination of Cumulative Effects on the Aquatic Ecosystem

Cumulative impacts due to past, current, and reasonably foreseeable future projects (1 to 3 years) in concert with the Applicant's Proposed Project Alternative are not anticipated to have significant adverse impacts to most environmental resources within the Project area. The majority of environmental impacts associated with the other projects will be temporary and would comply with various State and Federal environmental regulations.

Projects included in the cumulative impact analysis that involve dredging may result in temporary impacts such as increased turbidity, air emissions, and long-term impacts to the harbor bottom.

Fill actions of some of the evaluated projects would have cumulative adverse impact on estuarine mud and sand bottom habitat and wetlands. Dredging associated with some evaluated projects would cumulatively result in conversion to deeper habitats, and dredging and placement of material would result in temporary and localized turbidity increases, removal of benthic communities, and burial of benthic organisms at placement areas. Most adverse impacts would be offset by mitigation and should not have a net cumulative adverse effect. Existing alterations to sediment transport patterns would be continued by several evaluated projects; however, negative effects would be offset to some unknown degree from beneficial use of dredged material and benefits realized from the Coastal Impact Assistance Program and Mississippi Coastal Improvement Program projects.

A cumulative increase in vessel traffic in the Project area would increase the risk of pollution, which increases the potential risk to the aquatic ecosystem. The proposed PGEP, and several other evaluated projects, would result in stabilization, protection, and beneficial use actions that would have a cumulative beneficial effect on aquatic ecosystems.

Regarding federally listed species, cumulative impacts of this Project and other evaluated projects would include displacement of piping plover, listed sea turtles, West Indian manatee, and Gulf sturgeon during construction, dredging, and placement activities, as well as degradation of habitat quality. As previously mentioned, the increased risk of spill and pollution could also translate to increased likelihood of impacts to federally listed species. This and several other evaluated projects could result in the increased cumulative risk of mortality or injury to listed sea turtles and Gulf sturgeon from impingement or entrainment during dredging activities; however, it is assumed avoidance, minimization, and mitigation measures would be in place to prevent jeopardizing future existence of these listed species. Several projects involving restoration, stabilization, protection, and beneficial use actions would have cumulative beneficial effects on threatened and endangered species.

Existing governmental regulations will address the Project impacts that could threaten the health and sustainability of the region, which can influence local and ecosystem-level conditions. Natural resources in the area are provided protection through coordination with stakeholder groups, local organizations, and State and Federal regulatory agencies implementing regulations such as the Clean Water Act, National Marine Fisheries Act, Coastal Zone Protection Act, Endangered Species Act, and the Clean Air Act. This collaboration concerning regulation of impacted resources should prevent or minimize potential negative impacts to these resources.

h. Determination of Secondary Effects on the Aquatic Ecosystem

The expansion of the Port would increase the industrial land uses of the greater Gulfport metropolitan area and would contribute to ongoing residential and commercial growth and development, which may indirectly lead to impacts to terrestrial vegetation communities. Continued moderate economic growth in the study area, which is anticipated with or without the Proposed Project Alternative, would perpetuate ongoing residential and commercial growth and development, having potential cumulative adverse impacts to some natural resources within the study area.

Some secondary effects on the aquatic ecosystem are expected to be beneficial due to contribution of sediments to provide needed particulate material for shoreline nourishment and as protection from shoreline erosion on the Mississippi and Louisiana coasts.

REFERENCES

- Anchor QEA LLC. 2015. Final Dredged Material Management Plan; Port of Gulfport Restoration Project. Prepared for the Mississippi State Port Authority. 165 pgs.
- . 2013. Sampling and Analysis Report Gulfport Turning Basin. Prepared for: Mississippi State Port Authority – Port of Gulfport, April 2013.
- Bolam, S.G., and H.L. Rees. 2003. Minimizing impacts of maintenance dredged material disposal in the coastal environment: a habitat approach. *Environmental Management*. Vol. 32, No. 2.
- CH2M HILL. 2011. Final Project Management Plan for Selected Beneficial Use Projects Along Coastal Mississippi. Prepared for: Gulf of Mexico Foundation and Mississippi Department of Marine Resources (MDMR). September 2011.
- Environmental Protection Agency (EPA). 1999. Ecological condition of estuaries in the Gulf of Mexico. EPA 620-R-98-004. U.S. Environmental Protection Agency, Office of Research and Development, National Health and Environmental Effects Research Laboratory, Gulf Ecology Division, Gulf Breeze, Florida. 80 pp. <http://www.gulfbase.org/bay/view.php?bid=mississippi1>.
- . 2013. National Coastal Assessment Database. <http://oaspub.epa.gov/coastal/coast>.
- Federal Register*. 2011. Intent to prepare an environmental impact statement for the Port of Gulfport Expansion Project, Harrison County, Mississippi (Department of the Army Permit Number SAM-2009-1768-DMY). Vol. 76, No. 48. Friday, March 11.
- McAnally, W.H., A. Teeter, D. Schoellhamer, C. Friedrichs, D. Hamilton, E. Hayter, P. Shrestha, H. Rodriguez, A. Sheremet, and R. Kirby. 2007. Management of Fluid Mud in Estuaries, Bays, and Lakes. Part II: Measurement, Modeling, and Management. *Journal of Hydraulic Engineering*. 133:1(23).
- Morton, J.W. 1977. Ecological effects of dredging and dredge spoil disposal: a literature review. Technical Papers U.S. Fish and Wildlife Ser. #94
- Newell, R.C., L.J. Seiderer, and D.R. Hitchcock. 1998. The impact of dredging works in coastal waters: a review of the sensitivity to disturbance and subsequent recovery of biological resources on the sea bed. *Oceanography and Marine Biology: an annual Review*. Vol. 36:127–78.
- Orlando, S.P. Jr., L.P. Rozas, G.H. Ward, and C. J. Klein. 1993. Salinity characteristics of Gulf of Mexico estuaries. Silver Spring, Maryland. National Oceanic and Atmospheric Administration, Office of Ocean Resources and Conservation Assessment. 209 pp.
- Seim, H.E., B. Kjerfve, and J.E. Sneed. 1987. Tides of Mississippi Sound and the adjacent Continental Shelf. *Estuary, Coastal and Shelf Science*. Vol. 25:143–156.
- T. Baker Smith. 2006. The Biloxi Marsh Stabilization and Restoration Plan. Prepared for: Biloxi Marsh Lands Corporation. June 2006.

- Thompson Engineering. 2015. Revised Sediment Sampling Report, Beneficial Use of Dredged Material Evaluation, Port of Gulfport Spool Base, Gulfport, Harrison County, Mississippi. Thompson Engineering Project No.: 14-1101-0352. July 23, 2015.
- U.S. Army Corps of Engineers (USACE). 1992. Letter to Great Lakes Dredge & Dock Company and Gulf Coast Trailing Company. Regarding: Notice to Proceed for Contract Number DACWOI-92-C-0060 (IFB DACWOI-92-B-0038) Gulfport Harbor Deepening Gulfport, Mississippi. April 29, 1992.
- . 2006. Final sediment quality characterization of the Gulfport Harbor Federal Navigation Channel. Dredged Material Evaluation – Gulfport Harbor Navigation Channel. U.S. Army Corps of Engineers, Mobile District. 269 pp.
- . 2009. Recovery – Indefinite Delivery Indefinite Quantity for Gulfport Harbor Channel Improvements and other Mobile District projects. Issue Date: August 14, 2009.
- . 2011. Port of Gulfport dredging history cards (1960 to Present). U.S. Army Corps of Engineers, Mobile District. Data received August 12, 2011.
- Wilber, D.H., and D.G. Clarke. 2001. Biological effects of suspended sediments: a review of suspended sediment impacts on fish and shellfish with relation to dredging activities in estuaries. *North American Journal of Fisheries Management* 21:855–875.

**Findings of Compliance with
Section 404(b)(1) Guidelines
Port of Gulfport Expansion Project
Mississippi State Port Authority**

1. No significant adaptations of the Guidelines were made with respect to the evaluation completed for this project.
2. The Applicant's Proposed Project Alternative is the result of a thorough evaluation of alternatives.
3. The Applicant's Proposed Project Alternative will not violate any applicable State or Federal water quality criteria or toxic effluent standards of Section 307 of the Clean Water Act.
4. The Applicant's Proposed Project Alternative will not jeopardize the existence of any federally or State-listed threatened or endangered species and/or their critical habitat or violate any protective measures for any sanctuary. Various resource agencies, including U.S. Fish and Wildlife Service and National Marine Fisheries Service, have been consulted regarding potential issues of any federally or State-listed threatened or endangered species and/or their critical habitat. Appropriate avoidance and minimization measures would be implemented accordingly, based on agency coordination.
5. The Applicant's Proposed Project Alternative will not result in adverse effects on human health and welfare, including municipal and private water supplies, recreation and commercial fishing, plankton, fish, shellfish, wildlife, and special aquatic sites. There are no significant adverse impacts expected to the aquatic ecosystem diversity, productivity and stability, or recreational, aesthetic, and economic values.
6. Appropriate steps to minimize potential adverse impacts on the aquatic system include close coordination with state and Federal resource agencies during final Project design prior to construction to incorporate all valid suggestions.
7. Based on the guidelines, the Applicant's Proposed Project Alternative is specified as complying with the requirements of the Section 404(b)(1) guidelines.

Craig Litteken
Chief, Environmental Section
U.S. Army Corps of Engineers, Mobile District

Date

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